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PUBLIC STATEMENT OF ROGER SWANSON

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MR. SWANSON: I am Roger Swanson, retired geologist for the U.S. Geological Survey.

I speak for myself and not for the survey.

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Ever since I first heard about the concept of burial at Yucca Mountain, I have been working along with the state in every way that I could to try to defeat the project. I think it's one of the worst decisions that Congress ever made.

Why? There are many problems that are contingent upon burial anywhere west of the Rockies except perhaps in part of the Colorado plateau such as the Grand Canyon area. There the rocks are fairly stable. But the rocks in Nevada are highly shattered, not just broken but they are highly shattered. Our mountain ranges in Nevada would be a lot higher if the rocks weren't so highly shattered.

But shattered rocks, weather, and our mountain ranges are therefore much lower than they would otherwise be. This is an area of much catastrophe. We haven't had them lately around here. The most recent I guess was Mount St. Helens in Washington. But we have had lots of earthquakes. This is earthquake country.

We have a map in Reno that comes out almost every week showing the earthquakes in a region of a couple hundred miles across. And that area includes the area at Mammoth Hot Springs, and in that area alone they may average around 50 earthquakes a week, not just a month or a year, and I have seen the earthquakes on that map run well over a thousand a week for week after week.

This is earthquake country. Mammoth Hot Springs is not very far from Yucca Mountain. Within a hundred miles. I don't know the exact distance. I haven't measured it. It doesn't matter. That's pretty close.

In the past, as a geologist -- let me back up . As a geologist, my time sense is quite different from the time sense of most people in this country. We think in terms of millions of years, not of tens or hundreds or even thousands. So my concerns are over the long haul, and anything radioactive like that, the half life of radioactive materials is extremely long. In terms of the age of the

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earth, earth's very long.

So we have in this area lots of earthquakes. There was one at San Bernardino a few years ago, the Lander earthquake, the north-south fault that extended up into Nevada, all the way to the test site and knocked out the controls at the Test Site. If that could happen, and what a message there could be for the government, I couldn't think of a better one.

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In addition to which we have lots of volcanoes in this country. The Cascades in Washington and Oregon, and the north end of the Sierras in Nevada, Shasta, and the other one I can't think of right now -- doesn't matter -- this is earthquake -- this is volcanic country. And we have lots of volcanoes that have happened in the past.

In Oregon, at Crater Lake, that whole crater, that was a tremendously large volcano at one time, and it blew. It spread ash all the way to Nebraska and so forth.

When the Mount St. Helens earthquake, yes, when the Mount St. Helens blew, I was back in Washington, D.C. at that time, and I woke up one morning, and it was about six days later, and I found ash on my windshield back there. The ash went around the world actually.

So this is volcanic country. We never know where a volcano is going to happen.

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Not within a hundred miles east of Yucca Mountain we have had tremendous explosions in volcanoes in the past. When the rock comes out from a volcano and so hot that when it falls it re-fuses back into solid rock. We call that material ignimbrite. In the Monitor Range of Nevada, I have been on ignimbrite deposits that are more than 5,000 feet thick. Now that was a tremendous explosion, and I have been on many mountain ranges in Nevada where there has been ignimbrite covering the older rocks underneath.

Those happened perhaps as many as 20 million years ago. I can't tell you for sure. But that doesn't say they are not going to happen again.

We have an area here of thin continental crust. This used to be part of the sea. And it was taken away from the sea and became part of our continent.

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I think that's the reason why the crust in this part of the continent is thin. Normal crust is about 35 miles thick. Oceanic crust is about 10 miles thick. We're in between in this area. Perhaps in the neighborhood of 25 miles thick.

We have lots of geothermal energy in Montana. We produce power from geothermal energy. We have lots of hot springs. All of that fits in with the concept of a thin crust. They all go together.

I think many of our mineral deposits in Montana are a reflection of that thin crust. And I think also the breakup of the rocks in Nevada, and Nevada rocks are highly shattered, I think they are likewise related to the thin crust. An area between -- this is an area between Wasatch and the Sierras, and that whole area is rising. It's like a very big balloon. And if you figure covering the balloon with plaster of paris and then putting some more air into it, it will break up. And that's what happened to the crust of the earth here.

And that's why our mountain ranges, they're fault block mountain ranges, some blocks have risen higher than others, and the high ones are the mountain ranges, and the low ones are the valleys, but they have all been going up.

For example, in the Colorado plateau near the Grand Canyon, gooseneck of the San Juan, I hope you have been there and seen them. If you haven't, I'd recommend that you see them. But they are meanders that are deeply entrenched into the old rock.

Now normally a meander, which is a meandering stream, a meander will travel downstream. These rocks are going right straight down trying to get back to sea level. And I think the meanders first formed when that area was not very high above sea level. And they would have traveled but the area had been rising, and so the meanders are strictly going straight down. Deeply entrenched into the hard rock. And they aren't moving at all except downward.

The Grand Canyon itself is going downward. It is trying to get back to sea level. But it can't.

The Colorado plateau is over 8,000 feet around the rim of the canyon. And that used to be not very high above sea level.

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So this whole area is rising. And at the same time, it's

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stretching. And that's why we have the fault block mountain ranges in Nevada.

With that kind of an environment, I think it's a mistake, a very big risky mistake to bury anything like highly radioactive material. We never know where the next earthquake or the next volcanic explosion will occur. | We don't know where and we don't know when.

But the likelihood I think is very great that somewhere in this region we're going to have a tremendous catastrophe, and I call these things catastrophic. I think the 1906 quake in San Francisco was on the lower end of what could possibly be the range that could happen in a catastrophe.

We have had many many other earthquakes. I can't remember the names of a lot of them. The recent one at San Francisco that broke up the bridges and so forth. The San Leandro -- no, the big one down in Northridge in California. We have had lots of earthquakes. And we have had volcanoes. And we're going to have more. We can almost be certain that there are going to be more, and we think there is a good reason to believe that they could be very strong.

I don't want to throw people into too much concern about this, but I think they should be concerned. This is a major concern to this whole region.

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And therefore, | I consider anything burial at Yucca Mountain as in the latitude of a big risk, | and I recommend therefore that -- well, I have recommended for a long time, I have written to the President, to Congress, about this idea. | I think any money spent in Yucca Mountain is strictly a waste of money. They are learning something about it. But it's waste as far as application to that site. | Thank you.

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